RURAL FIRE PROTECTION

As Recommended by the

CALIFORNIA RURAL FIRE INSTITUTE

PUBLISHED BY
BOARD OF FIRE UNDERWRITERS
OF THE PACIFIC
1929
Revised 1938

RURAL FIRE DISTRICT ORGANIZATION

SUGGESTED REGULATIONS
FOR
RURAL FIRE DEPARTMENTS
AND
SUGGESTED SPECIFICATIONS
FOR
RURAL FIRE TRUCKS

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PREFACE

Due to the excessive grain fire losses in the State of California during the summer of 1928, Governor C. C. Young appointed a committee from his cabinet to investigate ways and means of suppressing roadside and grain fires. Various organizations interested in rural fire protection were consulted by the committee and a conference of representatives of these organizations was held at Davis, California, on September 12, 1928, under the auspices of the College of Agriculture, University of California. At this meeting committees were appointed to prepare suitable regulations for rural fire departments and specifications for grass and grain fire fighting equipment. The work of these committees was adopted by the conference December 21, 1928, and was published in pamphlet form early in 1929, in the hopes of encouraging protection against fire on the farm, especially in grain areas. The Conference developed into the California Rural Fire Institute which has been instrumental in developing rural fire protection throughout the State.

At a meeting of the California Rural Fire Institute held at Davis, March 25 and 26, 1937, a committee was appointed to revise "Rural Fire Protection." The committee was given authority to proceed with the publication and this edition of the pamphlet is the result.

Mr. Metcalf has rewritten the chapter on organization which gives a complete picture of the rural fire protection plan in California and outlines the proper procedure to organize a district under the State Laws as they have been amended to date. Changes have been made in the suggested specifications to take advantage of recent developments in automotive apparatus.

METHODS OF ORGANIZING FOR EFFECTIVE FIRE PROTECTION IN CALIFORNIA

By Woodbridge Metcalf, Extension Forester, University of California.

Because of climatic conditions and character of vegetation, a large part of the area of farm, foothill and forest lands in California is subject to more or less severe damage by fire during a period of from four to six months each year. Such damage is not only important in the immediate vicinity of these fires where lives are endangered and homes, improvements, grain-fields, range and timber are destroyed. Where vegetative cover is thus removed from important watershed areas, the resulting soil erosion, silting of important reservoirs and severity of flood peaks are often of far-reaching consequence to both rural and urban populations. For these reasons the prevention and rapid suppression of such fires is the concern of Federal, State, County and local governments and a number of laws have been passed to provide for adequate fire fighting equipment and to facilitate effective co-operative action in fire suppression.

In the following paragraphs an attempt will be made to explain important provisions of these laws and describe how they are being used to further the protection of resources in California from damage by fire. Several methods of organization are possible and each is being used in some part of the State. By careful analysis of the local situation it should be possible for any district to work out a method or combination of methods well suited to its needs.

Protection of Lands of the United States

Something over 25% of the area of California is in Federal ownership and its protection is carried on as follows:

a. National forest lands are protected by the United States Forest Service of the Department of Agriculture.

b. National park lands are protected by the National Park Service of the U. S. Department of the Interior.

c. Indian Reservations are protected by the Indian Service of the U. S. Department of the Interior often through cooperative agreements with the State Division of Forestry.

d. Unallotted public domain lands are protected by the State Division of Forestry, or the United States Forest Service through the allocation of Federal funds from the appropriation for the U. S. Forest Service.

Additional Cooperation in Fire Protection by the United States

The interest of the nation in effective protection of lands from damage by fire was recognized in the passage by Congress of the Clark-McNary Act of June 7, 1924. (Ch. 348, 43 Stat. at L, 653; U. S. C., Title 16, Secs. 471, 515, 564-570.) (Amended by Act of April 13, 1926, c. 119, 44 Stat. at L. 242.) Under this act, Federal money is allocated for the cooperative protection of important timber and water shed areas to the State Division of Forestry. That Division, in turn, allots a share of the Federal funds to counties and other cooperating fire protection agencies in proportion to their expenditures for this purpose. Under present conditions about $150,000 is received by California each year under this authorization.

Sections 1 and 2 of this act are quoted in full as follows:

Sec. 1. That the Secretary of Agriculture is hereby authorized and directed, in cooperation with appropriate officials of the various States or other suitable agencies, to recommend for each forest region of the United States such systems of forest fire prevention and suppression as will adequately protect the timbered and cut-over lands therein with a view to the protection of forest and water resources and the continuous production of timber on lands chiefly suitable therefor.

Sec. 2. That if the Secretary of Agriculture shall find that the system and practice of forest-fire prevention and suppression provided by any State substantially promotes the objects described in the foregoing section he is hereby authorized and directed, under such condi-

tions as he may determine to be fair and equitable in each State, to cooperate with appropriate officials of each State, and through them with private and other agencies therein, in the protection of timbered and forest-producing lands from fire. In no case other than for preliminary investigation shall the amount expended by the Federal Government in any State, during any fiscal year, under this section, exceed the amount expended by the State for the same purpose during the same fiscal year, including the expenditures of forest owners or operators which are required by State law or which are made in pursuance of the forest-production system of the State under State supervision, and the Secretary of Agriculture is authorized to make expenditures on the certificate of the State Forester, the State Director of Extension, or similar State official having charge of the cooperative work for the State that State and private expenditures as provided for in this section have been made. In the cooperation extended to the several States due consideration shall be given to the protection of watersheds of navigable streams, but such cooperation may, in the discretion of the Secretary of Agriculture, be extended to any timbered or forest-producing lands or watersheds from which water is secured for domestic use or irrigation within the cooperative States. (Amended by Act of April 13, 1926, c. 119, 44 Stat. at L. 242.)

As funds secured under the Clark-McNary Act. may be expended only on timberlands or watershed lands, the State has been divided into the following zones:

ZONE 1. Of primary importance for timber or watershed.

ZONE 2. Of secondary importance for timber or watershed.

ZONE 3. Of little or no importance for timber or watershed.

It will be evident from this that considerable areas of valley farm and grazing land are thus excluded from cooperative protection under this act. Thus it is necessary that they be given protection through the expenditure of State, County or local funds.

Protection of Lands of the State of California

At the present time there is comparatively little area in State ownership. The State Park system of 293,129 acres, two small State Forests, and scattered school lands outside National Forest boundaries are given protection by the State Division of Forestry. There is an increasing reversion to the State of lands for non-payment of taxes. There is definite need for legislation to permit the blocking up of such lands into State Forests for permanent management and protection for the benefit of all the people. Until that is done, these lands will continue to be a "No man's land" without plan or purpose, and subject to recurring fire damage and erosion.

The California State System of Forest Fire Protection

The initial protection of lands from fire by the State of California aside from the appointment of volunteer fire wardens, became effective on July 22, 1919. (Stats. 1919, Ch. 176.) Section 1 of this act under which a large part of California is organized for fire protection is quoted as follows:

SECTION I. For the prevention and suppression of forest fires the State Board of Forestry shall:

a. Make and enforce such rules and regulations as may be necessary and proper for the organization, maintenance, government and direction of the fire protective system provided for in this act;

b. Divide the state into such number of suitable and convenient fire districts as may be necessary;

c. Appoint a district fire ranger for each of such fire districts to serve during the seasons when fires are liable to occur at a salary of not to exceed one hundred and fifty dollars per month and necessary expenses. Said district fire rangers shall, under the direction of the State Forester, have charge of the fire fighting system and men in such districts; and shall be charged with the duty of preventing and extinguishing forest fires and with the performance of such other duties as may be required by the forester;

d. Provide all proper fire prevention and fire fighting implements and apparatus, organize fire companies and establish observation stations and employ men to attend them in all fire districts established as herein provided; construct and maintain telephone lines and provide such other means of communication as shall be necessary to prevent and extinguish fires.

SECTION II authorizes the State Forester to cooperate with federal, county, municipal and private agencies for fire protection, forest management, reforestation, and afforestation. He may enter into cooperative agreements with the Federal Government, and with the approval of the Board of Control, with any county, municipality, person, firm, association or corporation—"for the purpose of maintaining a fire patrol system for the prevention and suppression of any forest fires in any timber, brush, grass or other inflammable vegetation or material; provided that the expenses incurred by the terms of said agreements shall be paid from the appropiations or funds available for forest fire protection. In the case of agreements with persons, firms or associations, the State will not be held for payment of more than one-third of the cost of such fire prevention and suppression."

SECTION III. Authorizes the State Forester to appoint special fire rangers and vest them with the same powers as district rangers at the request of land owners who employ these men as patrolmen for the protection of their lands against fires.

A provision (a) added by (Stats. 1931, Ch. 192.) provides for the appointment by the State Forester of public spirited citizens as voluntary fire wardens, "in such number and localities as he deems wise,—who may receive payment for their services from the counties or from private sources. They shall promptly report all fires and take immediate and active steps toward their extinguishment, report any violation of forestry laws, assist in apprehending and convicting offenders, and perform such other duties as the State Forester may direct."

SECTION IV gives the State Forester, his assistants, rangers, and voluntary fire wardens the power to summon any able-bodied male to assist in suppressing any forest fire at a rate of compensation of 25c per hour of service actually

rendered. Refusal to comply with such summons constitutes a violation of this act.

SECTION V. "The State Forester, Deputy State Forester, assistant state foresters, district fire rangers, special fire rangers and such fire wardens as are especially designated by the State Forester shall have the powers of peace officers to make arrests without warrant, for violation of any State, County or Federal fire law, and none of them shall be liable to civil action for trespass committed in the discharge of their duties." (Amended by Stats. 1931, Ch. 192.)

SECTION VI is important because it defines the term "forest fire" as used in this act as "any fire burning uncontrolled on any lands covered wholly or in part by timber, brush, grass, grain, or other inflammable vegetation."

SECTION VII covers the details of arrest and release from arrest on identification and promise to appear before a designated magistrate in person or by counsel; and penalty for violation of such promise.

SECTION VIII provides penalty for violation of any of the provisions of this act as a misdemeanor with designated fine and jail sentences for conviction.

Procedure Under This Act—It is evident from reading the above provisions that the State Forester is granted very broad powers of cooperation with all types of political units, associations of land owners and with individuals for fire protection. The usual procedure is for a county to sign a cooperative agreement with the State Forester after a study of the situation has been made and recommendations have been discussed. In these agreements the County Board of Supervisors state that they will put up a designated amount of money each year for the purchase of equipment and other fire prevention work. The State Forester agrees to appoint a state ranger to have charge of fire prevention and suppression in the county who will supervise all work in fire prevention and be in charge of all fires. The State further agrees that the County will not be called upon for costs of fire suppression in excess of the amount designated in the agreement. Thus it works out usually that the County funds are expended for fire prevention and for necessary equipment for fire fighting. The State then defrays the costs of fire suppression.

While this is the usual form of cooperation, it is perfectly possible for an association of land owners, a district of a county, or even a small village or municipality having land covered with inflammable vegetation to request analysis of the fire protection problem by the State Division of Forestry and the working out of a cooperative plan of action.

The Forest Land Fire Patrol Act

This law entitled "An act to require owners of forest lands to provide a fire patrol therefor (Stats. 1923, Ch. 313.) reads as follows in Section 1:

> Every owner of forest land except redwood forest lands in the State of California shall furnish or provide a sufficient and adequate fire patrol therefor during the season of the year when there is danger of forest fires, which patrol shall meet with the approval of the State Board of Forestry.

Residence of the owner within 1½ miles of the further boundary of a parcel of such land is considered to constitute adequate patrol within the meaning of the act. Assessment of 2c per acre from non-resident owners of such land is provided for with payment of such moneys into a "State Board of Forestry fire prevention fund" to be used by the State Forester in carrying out the provisions of the act.

Forest land is defined as "Any land which has enough forest growth standing or down or has sufficient inflammable forest debris to constitute, in the judgment of the State Board of Forestry, a fire menace to itself or adjoining land."

This act makes it possible to spread the costs of protecting land from fire uniformly over a district in which much of the land may be held by non-resident owners.

The Hazardous Fire Area Act

This act (Stats. 1929, Ch. 115.) authorized the State Board of Forestry upon written petition of owners or agents of more than 50% of the land, including public land, within the exterior boundaries of any area of not less than 10,000 acres, to designate it as a hazardous fire area. After such designation it is unlawful to build fires within such areas, except in camp sites established and designated for the pur-

pose. No such camp grounds shall be set up without the consent of the owner of the land. Notices of the creation of such hazardous fire areas will be given by the posting of notices at intervals of not greater than one-third mile along the exterior boundaries, or along roads and trails passing through such lands.

The act in Section 3 reinforces the regulations for fire prevention within the National Forests by declaring it unlawful for any person to smoke or build a camp fire upon national forect land without the written permit issued by an authorized agent of the Secretary of Agriculture of the United States, or without possession of the fire fighting tools required by such permit.

The County Participation in Cooperative Fire Protection

Supplementing the above Federal and State provisions for fire protection, any County Board of Supervisors is authorized to expend not to exceed 2c per one hundred dollars of assessed valuation of the county in any one year, for the purpose of protecting forest, brush and grass lands therein against fire or other injury. (Stats. 1931, Ch. 600, and Pol. Code: Section 4041.6 -3-). The Board of Supervisors may also enter into a contract with any incorporated city or town, or chartered city, for fire prevention and suppression within the city limits by the county fire warden (Stats. 1921; Ch. 317).

Los Angeles County has built up the most intensive county fire protective system under this authorization with a number of county ordinances covering special hazards and requirements, and a recently passed fire prevention code. The Fire Prevention Code of the County of Los Angeles (Ordinance 2947 N. S. and Amending Ordinance 2994 Nov. 1937) has been published as a complete booklet of 108 pages. Copies may be secured from the Fire Prevention Bureau, Dept. of Forestry and Fire Warden, 504 N. Spring Street, Los Angeles, at 50 cents each. Copies of several of the more important chapters such as: Chap. 13—Open Fires—Smoking—Blasting, and Chap. 16—General Fire Prevention Regulations—have been printed separately and are available without charge. This is designed to give county areas about as intensive fire protection as is to be had in most munici-

palities. More than thirty other counties are co-operating with the State Division of Forestry under the above authorization and those indicated under the State System of Forest Fire Protection.

Organization of Rural Fire Districts

Shortly after the first settlers came to California, attempts were made to provide for protection of lives and property against damage by fire. Most of the early efforts were of voluntary nature, but beginning in 1881 the State Legislature has from time to time passed laws under which organized fire protection can be provided for a district and its cost paid by taxation of all property benefited by such protection. Three different fire district acts have been passed and numerous amendments have been made to each one so that now they differ in only minor respects as regards direction, method of organization and details of management. It seems evident at the present time that had the state-wide system of fire protection been in effect over a long period of years, it would not have been necessary or desirable to organize many of these small districts. However, many of them have been functioning successfully for a long time. Under certain conditions they undoubtedly have their place and the provisions making possible effective cooperation between such districts, municipalities and the State are working to solve the problem of unprotected territory lying outside district boundaries.

(a) *The Voluntary Fire District*—Such a district is usually organized by a committee of influential citizens who are interested in better fire protection and who have the confidence of most of the people of the community. There are no articles of incorporation and the expenses of the district are taken care of by voluntary contribution, usually on an acreage basis. Assistance in organization and periodic inspection of equipment will be given by the State Forester or the Board of Fire Underwriters if requested. The success of such a district depends largely upon the unselfish interest and hard work of a few individuals and upon the willingness of at least a considerable number of property owners to contribute their share of the expenses. There is always the possibility that some property which benefits materially from the protection afforded will not bear its proportion of the

cost and so lead to much dissatisfaction. There are some outstandingly successful fire districts of this kind which have been in operation for a number of years, but as a general rule the incorporated district is assumed to be on a firmer and more permanent foundation.

(b) *The Town or Village Fire District Act. of* 1881 (Stats. 1881, Ch. 36 with amendments to and including Stats. 1935, Ch. 740.) This act is quoted in full with all amendments in the bulletin entitled, "State of California Forest and Fire Laws—1937," issued by the Division of Forestry of the Department of Natural Resources, Sacramento. It therefore seems desirable to give only an outline of essential provisions and methods of procedure under the act.

(1) Any unincorporated town, village or area of this State may be organized as a fire district and may equip and maintain a fire department for the purpose of protecting property from destruction by fire.

(2) Fifty or more taxpayers and residents of any town or village or unincorporated area may petition the Board of Supervisors of the county for the formation of a fire district.

(3) The Board of Supervisors shall call a hearing on the matter and give notice of it by two publications in a newspaper published in the county, or by posting such notice in three public places in the county at least ten days prior to the time fixed for such hearing. After such hearing and due consideration the Board of Supervisors may grant the application, determine the boundaries of the district, and appoint three fire commissioners who shall hold their office until the second Monday in the following April and until their successors are elected and qualified.

(4) This Board of fire commissioners have the following duties:

They have perpetual succession.

Make arrangements for water supply and distribution and the full equipment of a fire company or department.

Call an election and submit to the electors residing in the district, the question whether a tax shall be levied and raised for the purpose of establishing and equipping a fire department.

Determine the amount of money necessary to maintain the fire department and report this to the Board of Supervisors of the county not later than the first of August of each year.

Call and provide for conduct of necessary elections and issue certificates of election.

Borrow money and incur indebtedness in anticipation of revenue, but not to exceed the total amount of the estimated tax income for current or ensuing year.

Purchase, accept, lease or dispose of real and personal property of all kinds necessary to the district and its work.

(5) The board of fire commissioners are self-perpetuating by means of an election held each year on the first Monday of April; one being elected each year for a term of three years.

The rest of the Act deals with the powers of the board of fire commissioners to adopt ordinances to prevent fires, abate fire hazards within the district; for modification of the boundaries of district and for its ultimate dissolution if necessary.

(c) *The Fire Protection District Act. of* 1923. (Stats. 1923, Ch. 191 with later amendments.) This act is quoted in full with all amendments in the bulletin entitled, "State of California Forest and Fire Laws—1937," issuel by the Division of Forestry of the Department of Natural Resources, Sacramento. The following is a brief outline of essential provisions and methods of procedure:

(1) Any incorporated territory in a county and not including any forest land protected by the State Board of Forestry or in a manner approved by that board may be formed into a county fire protection district. Any city of the sixth class adjacent to the district may be included as part of it by filing of an ordinance stating its desire to join the district passed by its board of trustees with the Secretary of State at Sacramento and with the clerk of the county board of supervisors.

(2) The Board of Supervisors may determine that a portion of the unincorporated territory of the county is in need of fire protection and should be formed into a fire protection district. They fix the time and place for a hearing on the

matter and direct the clerk of the Board to publish notice of the hearing in a newspaper of general circulation in the territory to be included in the district. Notice shall also be posted in three public places in the territory at least 10 days prior to date set for such hearing. This notice shall set forth the exterior boundaries of territory to be included, which shall be, so far as practicable, the center lines of highways.

(3) Written objections to formation of the district may be filed by any person for consideration by the Board of Supervisors. After the hearing the board may change the boundaries, adandon the project or proceed with its organization.

(4) The Board of Supervisors on decision to proceed shall by resolution provide for holding a special election within the proposed district and submission to the qualified electors therein of the proposition of forming such a district. Date of such election shall be at least 20 days after passage of the resolution which shall indicate the proposed boundaries of the district. If the proposition is approved by a majority of the votors the Board of Supervisors enters a finding to that effect on its minutes and the district is then established and organized.

(5) The Board of Supervisors of the county is the governing body of such a county fire protection district, and shall have power to make and enforce all rules and regulations necessary for the administration and government of such district and for the furnishing of fire protection thereto and for the elimination of fire hazards therein. The Board of Supervisors is given broad powers to do all things necessary to eliminate fire hazards and provide for adequate protection within the district, including the adoption of ordinances deemed proper to prevent fires and conflagrations. Such ordinances may provide for the elimination of dry grass, weeds and inflammable matter from property and the adding of cost of such removal to the taxes of the owner.

(6) On written request of the Board of Supervisors the Chief of the Division of Forestry is authorized to exercise a general supervision over and make and enforce all necessary and proper rules and regulations relating to the type and nature of all fire fighting and fire prevention apparatus; the maintenance and upkeep of such implements and appa-

ratus purchased by the district; maintaining and increasing of efficiency of the district and the reporting of cause, extent and damage resulting from each fire within the district.

(7) The Board of Supervisors shall levy a tax each year equally upon all taxable property in each county fire protection district sufficient to defray the cost of maintenance thereof and to meet such other expenditures as are authorized by the act.

The balance of the act deals with additions or elimination of territory, consolidation of districts and dissolution by appropriate action on the part of the Board of Supervisors.

This is the act under which Los Angeles County has been operating to give intensive protection to all of its unincorporated territory.

(d) *The Fire Protection District Act. of* 1931. (Stats. 1931, Ch. 734.) This act is substantially the same in provisions as the act of 1881 except that it provides for the inclusion of territory lying within *one or more counties.* It is printed in full in the bulletin entitled, "State of California Forest and Fire Laws—1937," issued by the Division of Forestry of the Department of Natural Resources, Sacramento. Essential provisions are:

(1) Petition for formation of such a county fire protection district must be presented to the Board of Supervisors of the county in which the greater part of the lands lie by 25% or more of the holders of title or evidence of title to lands lying in one body and whose names appear as such upon the last assessment rolls. The petition sets forth the exterior boundaries of the proposed district.

(2) The Board of Supervisors passes a resolution of intention to form such a district, naming it and describing its boundaries. This resolution fixes a time and place for the hearing of the matter not less than 30 days after its adoption and for suitable publication of notice to residents in the district.

(3) After hearing of any protests and making such modifications of boundaries as seem desirable, the board by resolution determines whether or not such district shall be formed.

(4) The board divides the territory into three or five divisions of approximately equal size. One director who shall be

a resident of the precinct for which he is elected shall be elected to represent that division. If requested in the petition three residents of the district shall be elected at large by the district.

(5) Details of election are provided for with the proviso that, "Holders of title or evidence of title to lands within the district, *and no others,* shall be permitted to vote in person or by proxy duly notarized and filed with the election board." Voters are reqired to vote yes or no on the question of formation of the district as well as to vote for directors.

(6) If the vote is favorable the Board of Supervisors declares the territory duly organized and certifies the election of the elected directors. By notification to Board of Supervisors in adjacent county in which some of the lands lie, they are advised of the favorable action. The organization is then complete.

(7) The directors enter upon their duties immediately and are given power to do all things necessary to provide adequate fire protection for the district. They determine the amount of money necessary each year to equip and maintain the district and certify the amount of tax required to each Board of Supervisors concerned. The amount of money for establishing and equipping such a district shall not be more than 1% of the assessable property within the district in any one year nor shall the amount raised for maintenance be more than one-half of 1% of the assessable property within the district.

The balance of the act is concerned with details of additions to and eventual dissolution of the district and disposal of its property.

It may be well to note here that, although the wording of the three acts is slightly different in the matter of levy of taxes for fire protection purposes, county assessors and county auditors seem inclined to consider that they have essentially the same meaning.

Supplementary Acts of Interest in Fire Protection

A number of other acts have been passed by the legislature which must be complied with or which may be taken advantage of in providing adequate fire protection. These

are all given in full in the publication, "State of California Forest and Fire Laws—1937" so that only brief mention of the import of each will be given here.

(a) *District Investigation Act. of* 1933. (Stats. 1933, Ch. 806.) This is described as, "An act to provide for a preliminary investigation report and hearing upon the organization of the special tax and assessment districts and providing certain restrictions and limitations upon the organization of same and providing for the termination of proceedings for the organization thereof by protest of the owners of a majority of the property subject to assessment for district purposes." It is designed to put a check upon the too hasty formation of assessment districts by requiring very careful analysis and report by the proponents. It applies to all three of the above Fire Protection Districts as well as to 19 others. The supervisory body is required to have prepared by a competent person, a written report upon the proposed district which shall be a comprehensive study of the intended project.

By amendments added in 1937 each of the fire protection district acts is exempted from Section 4 of this act which requires that the petition for formation of the district be accompanied by a bond approved by, and in an amount fixed by the supervisory body at double the probable cost of organizing the district and conditioned that the sureties will pay all costs in connection with the proposed organization in the event that the district is not formed.

(b) *Contracts between County Fire Protection Districts and Municipalities.* (Stats. 1935, Ch. 273.) This act is important enough to be quoted in full as follows:

> SECTION I. In addition to all powers otherwise conferred, the governing board or board of directors of any county fire protection district shall have the power to contract with any municipality or municipalities contiguous to such county fire protection district, for the furnishing of fire protection to such district by such municipality or municipalities and the legislative body of any municipality in this State shall have jurisdiction and power to contract for the furnishing of such fire protection to such district or districts in such manner and to such extent as such legislative body may deem advisable.

SECTION II. All of the privileges and immunities from liability which surround the activities of any municipal fire fighting force or department when performing its functions within the territorial limits of such municipality shall apply to the activities of any such municipal fire fighting force or department while furnishing fire protection outside of such municipality under any contract provided for in Section I of this act.

Similar authorization and immunity are given to cities of the sixth class to make contracts for fire protection. (Stats. 1883, Ch. 49 and Stats. 1937, Ch. 243.)

Another authorization is given (Stats. 1929, Ch. 317) to the Board of Supervisors of any county wherein a county fire warden has been appointed to contract with any incorporated city or town, or chartered city for the services of the fire warden and his deputies and assistants for the prevention and suppression of forest fires. Provision is also made for payment by such incorporated city or town or chartered city to the county of such consideration as may be agreed upon, the same to be paid to the county treasurer of the county.

The term "forest fire" is again defined in this act as, "any fire burning uncontrolled on any lands covered wholly or in part by timber, brush, grass, grain, or other inflammable vegetation."

(c) *Cooperation in Fighting Fires of Large Proportions.* (Stats. 1937, Ch. 551.)—This new law is entitled, "An act to authorize cities, counties, or county fire protection districts to perform services for each other in extinguishing fires and providing for payment therefor." Its provisions are given in full:

SECTION I. Wherever a fire occurs which is of such proportions that it can not be adequately extinguished or handled by the fire department of the municipality or county fire protection district within which it occurs, or whenever a fire occurs without the limits of any municipality or county fire protection district, the apparatus, equipment and fire fighting force of any municipality or county fire protection district may be used for the purpose of extinguishing such fire.

SECTION II. The reasonable value of the use and the repairs and depreciation on such apparatus and equipment, and such other expenses as are reasonably incurred in furnishing such fire fighting services, shall constitute a charge against the municipality or county fire protection district in which such fire may have occurred, or in the event such fire may have occurred outside the boundaries of any municipality or county fire protection district, a charge against the county in which such fire may have occurred. The entity rendering the service shall present a claim to the entity liable therefor, in accordance with predetermined schedules of payments agreed upon by the respective entities. If such claim be approved by the head of the fire department in the entity to which presented, if any, and by the legislative body thereof, it shall be paid in the same manner as other charges against the funds thereof. If not so paid suit may be instituted for the collection thereof.

SECTION III. Whenever a fire occurs in any county or within the boundaries of any national forest which is of such proportions that it can not be adequately extinguished or controlled by the forestry department or fire warden of said county or the facilities of the Division of Forestry of the State of California or of the United States Forest Service, the personnel, equipment and fire fighting facilities of any county of this State may be authorized by the State forest ranger within said county or the county forester or fire warden or said county to assist in the extinguishment and control of any such fire. Where the personnel, equipment and facilities of any county are utilized in the extinguishment or control of any fire outside the boundaries of said county, the county furnishing such personnel, equipment and facilities shall be reimbursed by the county in which such fire occurs in an amount in accordance with a schedule of repayments there-to-fore agreed upon by the boards of supervisors of the said counties, or between the board of supervisors of any county and the Division of Forestry of the State of California or the United States Forest Service, as the case may be.

(d) *Expenditures for Forest Protection.* (Pol.,C. 4041.6.) Under such limitations and restrictions as are prescribed by law, and in addition to jurisdiction and powers otherwise conferred, the boards of supervisors, in their respective counties, shall have the jurisdiction and powers to appropriate and expend money from the general fund of the county for the following purposes:

* * *

The protection and reforestation of the watersheds of such streams and rivers;

* * *

To provide by ordinance for the organization and government of districts, to protect and preserve the banks of rivers and streams and lands lying contigous thereto from injury by overflow or the washing thereof, and to provide for the improvement of said rivers and streams, and prevent the obstruction thereof, and to provide for the assessment, levy and collection within such districts of a tax therefor. To appropriate a sum not exceeding two cents per one hundred dollars of the assessed valuation of their county in any one year, in addition to any sum which may be chargeable to the county for the repayment of money expended by the State for protection against fire in such county, for the purpose of protecting forest, brush and grass lands therein, against fire or other injury, and of aiding the State and Federal authorities in forestry work. (Added by Stats. 1929, Ch. 755. Amended by Stats. 1931, Ch. 600.)

(e) *Fire Prevention Education.* (Pol. C. 4041.33.) Under such limitations and restrictions as are prescribed by law, and in addition to jurisdiction and powers otherwise conferred, the board of supervisors, in their respective counties, shall have the jurisdiction and powers to authorize and provide for the education or information of the public relative to the prevention of fires and to the conservation of natural resources, and the presentation of information designed for the promotion thereof.

In providing for such education or information, such board may act through the agency of any appropriate

officer or department of the county having jurisdiction over the particular subject matter, and may provide for such education or information by means of the preparation and furnishing of lectures, motion pictures, steropticon slides or other projection of pictures, or by any means deemed appropriate by such board, and the cost of the preparation and furnishing of such education or information shall be a county charge.

Provided, however, that no provision of this section shall be deemed or construed as authorizing the publicizing of any county, or of any county officer or department, or of the work or accomplishments thereof. (Added by Stats. 1933, Ch. 554.)

(f) *Abatement of Weed Nuisances.* (Stats. 1929, Ch. 457.) (Amended by Stats. 1937, Ch. 345.) This law is described as, "An act authorizing counties to declare noxious or dangerous weeds growing upon the streets or sidewalks or upon private property in counties, to be a public nuisance, creating a lien upon the property fronting upon such streets or sidewalks or upon which such nuisance exists for the cost of abating the same, and providing that such cost shall constitute special assessments, and providing for the enforcement and collection of such special assessments."

This law can be of value in causing the removal of grass and weed fire hazards in advance of the fire season. It is not necessary to give its detailed provisions which will be found in the publication, "State of California Forest and Fire Laws, 1937."

(g) *Removal of Debris from County Roads.* (Sts. & H. C. 953.) A Board of Supervisors may, acting separately or in conjunction with State or Federal agencies, or with another county, burn or remove debris, rubbish, brush, and grass from the county highways. When acting in conjunction with other agencies or counties, a board may so act outside its county.

The expense incurred by a county, acting pursuant to this section shall be paid out of any road fund of the county. When a county is acting in conjunction with another agency or county the share of the expense to be borne by each shall be arrived at by agreement.

SUGGESTED REGULATIONS FOR RURAL FIRE DEPARTMENTS

SUGGESTED REGULATIONS FOR RURAL FIRE DEPARTMENTS

Introductory

The organization of any fire department is fully as important as the equipment provided, and the cement that holds an organization together is provided by its rules or by-laws. The following regulations are designed primarily for use in fire districts which include farm property, but may be adapted to any volunteer department.

It is assumed that the fire district will be formed under State Law and will be under the supervision of Fire Commissioners, Board of Directors or County Supervisors. A map of the district showing exact limits, section lines and location of all property should be provided. Copies of this map and fire suppression plan for the district will be filed as follows: (a) Board of Fire Underwriters of the Pacific, San Francisco. (b) Office of State Forester, Sacramento. The district should co-operate with existing fire control organizations of the State and Federal Forestry Departments.

Companies should be located in towns or villages within the district and distributed so that one will be within three to five miles of all property to be protected, or at least within twenty minutes' run.

Some definite means of receiving alarms should be established. This can be done best by maintaining a telephone in or near fire department headquarters where some one is available at all times. A public alarm should be provided where desirable, such as a whistle or large siren which can be operated by the public. It is suggested that cards be provided for all telephones in the district giving the correct number to call in case of fire. Wherever feasible, lookout stations should be provided at advantageous points.

Ordinances should be passed prohibiting the accumulation of rubbish or trash, governing the storage and use of explosives and inflammable substances, and eliminating dry grass hazards in advance of the fire season.

Water supplies should be developed within reach of all buildings. This may be obtained by providing connections to domestic supplies (where adequate), building sumps or providing places to draft from ditches, creeks or rivers. In case these supplies can not be obtained the deficiency can be partly offset by providing tank trucks to respond to every fire and install water tanks throughout the district.

Regulations

NAME: This organization shall be known as..... Fire Department of the.....Fire District of..... County, State of California.

PERSONNEL: The department shall consist of one Chief, one First Assistant Chief, one Second Assistant Chief, one Captain, one Lieutenant and firemen for each company. (Number of men to be decided by the Chief but enough to assure a response of at least six men.)

APPOINTMENTS: The Chief shall be appointed by the Fire Commissioners or County Supervisors to serve for an indefinite term and removable only for just cause after trial before the Fire Commissioners. Other chief officers and company officers shall be appointed by the Fire Commissioners upon recommendation of the Chief for indefinite terms. New members shall be elected by the department after thorough investigation as to the moral character, physical and mental ability of the applicant. Members must be 18 years of age.

All appointments and promotions shall be based upon ability, experience and interest in fire protection and prevention. Upon election into the department all members shall be required to sign these rules and regulations.

DUTIES: It shall be the duty of the Chief to enforce these regulations; to take complete charge at fires, when necessary, extinguishing them with the least possible loss of life and property; to investigate all fires as to origin, ownership, insurance carried and loss sustained, to keep complete records on forms provided for that purpose, and make or have made inspections as provided herein. He shall formulate a plan for fire suppression in the district, revising it when necessary to keep it up to date. He shall cooperate with the State Forest Ranger or County Fire Warden in

preparing a fire protection plan for the entire county. He shall be responsible to the Fire Commissioners for the condition of equipment and operation of the department at fires.

It shall be the duty of the Assistant Chiefs to take the position and assume the responsibilities of their superior officer in case of his absence, and to assist the Chief in carrying out his duties. Arrangements shall be made for one chief officer to be in the district at all times.

The Captain of each company shall be responsible to the Chief for the condition of equipment in his charge. He shall be in charge of all firemen assigned to his company and direct them at fires in his district until relieved by the Chief. It shall be the duty of the Lieutenant of each company to assist the Captain in carrying out his duties, and in the absence of the Captain to fill that position.

It shall be the duty of every fireman to respond promptly to fires in his territory, and in case of absence from the district to notify his superior officer before leaving.

DISCIPLINE: Strict obedience to orders of superior officers shall be observed at fires without argument. Any member of the department who is absent from three consecutive drills or fires in his territory without a valid excuse will be dropped automatically from the department.

DRILLS: Each company shall hold drills at least monthly. unless a working fire has occurred during that time, for the purpose of taining its members in the use of apparatus and equipment. Meetings of the department shall be held at least twice yearly for the purpose of discussing fire methods and fire prevention subjects.

INSPECTIONS: All apparatus shall be inspected by a chief officer at least monthly and by a company officer at least daily to assure its good condition. All property in the district shall be inspected by chief officers or members designated by them prior to the 15th of May each year to correct hazardous conditions and to familiarize themselves with aids and dangers in fire fighting.

RECORDS: A complete record of all fires shall be kept which shows: Date, Time of Alarm, Location of Fire, Owner of Property, Occupant, Type of Property, Cause of Fire, How Extinguished, Equipment Used, Officer in Charge,

Number of men responding, Value of property, Insurance carried and loss. This record shall be kept on a regular form which is available in quantity from the State Forester with whom a copy will be filed. Complete records shall be kept of all inspections made and hazards corrected; also of all apparatus and equipment, showing date of purchase, when tested, etc.

I hereby promise to do everything in my power to abide by and carry out these regulations.

.....

WITNESS:

.....

In addition to these regulations, by-laws may be drawn up forming a social organization, with officers elected annually.

SUGGESTIONS

The foregoing regulations are designed to fit as many cases as possible. It may be found, however, that they do not adequately cover a particular district, in which case changes should be made to meet the local conditions but definite regulations should be adopted in every department.

In order to clarify these regulations let us picture an effective fire district. The district may vary in size from a small territory where only one piece of apparatus is necessary to an entire county, but the fundamental organization is the same. For our purpose let us assume a district eight miles square which we will assume should have four pieces of equipment, or four companies, each covering an area four miles square. The companies are located in towns or villages near the center of their territories and each is in charge of a captain and a lieutenant. The chief of the department, who may be a County Fire Warden, with his two assistants is in charge of the entire department or all four companies and responds to all serious fires taking charge if he deems it necessary, otherwise the captain in whose territory the fire occurs has complete charge. In the case of a one company district the chief and his assistant take the place of the

captain and lieutenant. In any district the fire department is subject to inspection by the State Fire Ranger or other official designated by law.

Each company is organized with a certain number of men to assure a response of at least six members in any part of the territory. From three to five members of the department live in or near the town in which the apparatus is kept to assure their response with the equipment. The territory is divided into four or more fire wards. Members are required to respond to all fires in their particular ward and one member living in each ward is designated as a crew leader. It is his duty, in case of a fire in his ward, to have a certain group of men whem he can call upon to form "follow up" crews or fire lines and make provisions for supplying water for the apparatus. The crew leader may also be used as the inspector for his ward.

The fire alarm system may be operated by either of two different systems. First—Alarms of fire are telephoned to department headquarters (where the chief is located) which in turn notifies the proper company where a siren is located (in small districts the siren may be located at department headquarters.) Coded signals are used to designate the ward in which the fire is located. Second—Alarms of fire are telephoned to company headquarters and the siren sounds signals as above. Lookouts are stationed at advantageous points with telephone facilities for calling the department especially during the fire season. Where hills are not available oil or water tanks may be used to advantage. Every telephone in the district is equipped with a card giving the correct number to call in case of fire.

Each company holds a drill once a month especially if no fires have occurred and each spring and fall the entire department holds a meeting for the purpose of discussing fire prevention and fire supression methods. Before the fire season starts inspections are made by the chief, or members designated by him, for the purpose of eliminating hazards and noting aids in fire fighting. Complete records are kept of these inspections as well as of all fires.

SUGGESTED SPECIFICATIONS FOR RURAL FIRE TRUCKS

SUGGESTED SPECIFICATIONS FOR RURAL FIRE TRUCKS

General Requirements

In order to meet various requirements for rural fire apparatus, the Equipment Committee of the Rural Fire Institute decided that specifications for three sizes of trucks should be prepared. It should be understood, however, that trucks of intermediate sizes or combinations of two or more of the types specified can be provided and may be advantageous for certain local conditions.

Truck No. 1 is intended for use on Structures in small towns and on the farms as well as for use on grass and grain fires. Truck No. 2 is the standard grass and grain fire truck with provisions for fighting moderate structural fires for use in the valleys or where conditions are such that this size equipment can be properly handled. Truck No. 3 is a smaller grass and grain truck for use in hill sections or where a large truck cannot be properly handled. This apparatus may also be used as an auxiliary to one of the larger trucks or two No. 3 trucks may be used in place of one No. 2 truck.

It is generally recognized that grain or grass fires can be fought more effectively with two or more trucks. It is recommended, therefore, that arrangements be made for two or more trucks to respond to every fire of this kind.

The following general requirements are intended for all three types of trucks and should be considered as part of the individual specifications:

I—G: TRUCK CHASSIS:

1. Tires:
   a. Pneumatic, heavy duty balloon.
   b. Of such size that the tire manufacturer's load allowance will not be exceeded.
   c. All tires to be of the same size.
2. Road Clearances (Loaded) and Overhang:
   a. Axle clearance not less than 9 inches.

b. Rear step clearance not less than 50% of the overhang back of the rear axle.
Note.—A clearance of 40% of the overhang would be acceptable but 50% is to be desired.

c. Running board clearance not less than fourteen (14) inches.

d. Clearance of transmission system under truck not less than nine (9) inches.

e. Spare tire shall not be carried under truck frame if it impares clearance.

3. General Provisions:

a. Construction to be rugged, dependable and in accordance with approved automotive engineering practice.

b. Total weight of body and load shall not exceed the truck manufacturer's body and gross weight allowance.

c. Windshield of non-shatterable glass to be provided of adequate strength to protect driver from wind stream.

II—G: WATER TANK:

1. Material:

Not less than 12-gauge steel or a gauge giving equivalent strength in other material, protected from corrosion on the inside with two (2) coats of red lead or equal protection.

If tank capacity does not exceed 300 gallons, 16-gauge galvanized iron may be used if properly designed and braced.

2. Baffles:

Placed crosswise (and lengthwise of tank where tank is over 38 inches wide) same to be securely attached to walls of tank. If tank exceeds 6 ft. in length, two crosswise baffles should be used. The number of baffles should be sufficient to prevent rapid shifting of water.

3. Filler Opening:

At least five (5) inches in diameter and fitted with a deep-set screen. Opening to be so constructed as to

prevent water from splashing out and yet permit air to enter as water is removed. Filler opening may be tight if provision is made for other openings of ample size to allow free overflow of water.

4. Other Openings:

a. One for suction line to tank-pump—of suitable size for pump.

b. One for draining tank and filling hand extinguishers —not less than one (1) inch I. P. thread.

Note.—Any tank over 72 inches in length should be equipped with two openings to the discharge line, one within 15 inches of the front and one within 15 inches of the rear, connected to the suction line by means of a three-way valve, allowing suction from either end of the tank when pumping on grades.

III—G: TANK PUMP: (Pump which will take suction from tank.)

1. Operating Pressure:

Normal not less than one hundred twenty (120) pounds but capable of withstanding a shut-off pressure of not less than two hundred pounds.

2. Suction Lift:

Not less than eighteen (18) feet with dry pump.

IV—G: FITTINGS AND PIPING TANK PUMP:

1. Relief Valve:

a. Pump shall be provided with a relief valve or pressure regulation of sufficient capacity to prevent dangerous rise in pressure when pump discharge is quickly closed while pump is operating at maximum capacity.

b. The relief valve may by-pass either into the water tank or into the suction side of the pump.

2. Hand-Operated Relief or "Churn" Valve: (For positive displacement pumps.)

This shall be provided in addition to the automatic relief valve specified under IV—G-1. It may be used in filling water tank.

3. Pressure Gauge:

   A pressure gauge of approved type with suitable range shall be so mounted as to be easily visible to the operator while the truck is in motion.

4. Sediment Trap and Screen:

   A combined sediment trap and screen of ample capacity shall be so placed in the suction system that all water is drafted through it. It shall be readily accessible for cleaning.

5. Piping to Provide For:

   a. Drafting from either the water tank on the truck or from a water supply.

   b. Suction hose connections readily accessible. Provisions for pumping from both sides of truck desirable.

   c. Suitable discharge hose connections to be provided.

   d. Pumping directly into water tank from water supply at no pressure head.

6. Maximum Pressure and Vacuum Requirements:

   a. Pressure side to withstand one hundred fifty (150) per cent of shut-off pressures.

   b. Suction side, including suction hose, to withstand a vacuum of twenty-three (23) inches of mercury.

V—G: TANK PUMP DRIVE:

1. Power Take-Off (where pump is driven by truck engine):

   a. Must be capable of driving pump whether truck is moving or stationary.

   b. Should be provided with approved clutch or gear shift in which pump can be safely and quickly started and stopped.

   c. The assembly shall withstand the maximum engine speed and all units of the power take-off shall be in accordance with good engineering practice as to the mounting and for the stresses and speeds encountered.

2. Independent Engine (where pump is driven by an independent engine):

   a. Power: Not less than eight (8) B. H. P. In no case shall the sustained power of the engine be less than 133⅓ per cent of the power required to operate the pump at normal pump and engine speed at the pressure at which the relief valve is set.

   b. Number of cylinders: Not less than four (4).

   c. Electrical equipment:

      Ignition: High tension magneto with impulse starter or battery ignition of approved type.

      Starter: Electric starter and generator—provision to be made for hand cranking.

      Battery: To be of sufficient voltage and capacity to operate unit.

   d. Carburetion and fuel system of approved type.

   e. Cooling System: Circulating water type system equipped with radiator and fan of adequate capacity.

   f. Controls: Governor of approved type and installation to limit maximum speed. Additional controls to be installed to provide operation from drivers seat.

   g. The engine and pump drive assembly shall meet with the approval of the engineer representing the Board of Fire Underwriters of the Pacific.

VI—G: TANK PUMP AND FIELD FIRE EQUIPMENT:

1. Suction Hose:

   Not less than 24 ft. in lengths that can be carried without bending and of ample diameter for the maximum capacity of the pump, but in no case less than one and one-half (1½) inches in diameter.

2. Pressure Hose:

   a. Two hundred (200) feet of three-fourths (¾) inch size of approved type for the pressure used, with approved couplings having one (1) inch I. P. thread.

   b. Four (4) fifty (50) ft. lengths of one and one-half (1½) inch cotton, rubber lined fire hose with approved couplings having one and one-half (1½) inch

thread. Couplings to be of expanding ring type. Hose and couplings to withstand a working pressure of at least 300 pounds per square inch.

Note.—If I. P. thread is not used, adapters should be provided for connection to co-operative equipment.

3. Nozzles:

a. For Field Fires: Not less than two (2); either adjustable from one-eighth ($\frac{1}{8}$) inch to one-fourth ($\frac{1}{4}$) inch tip openings or a combination of two (2) or more nozzles of tips to vary type and volume of stream without delay. (The above range of sizes apply to pressures up to two hundred (200) pounds; for higher pressures the tip sizes may be reduced to give equivalent streams.) Butt size and thread to fit one (1) inch hose coupling. Provision should be made for nozzleman to quickly and easily shut off stream.

b. For Building Fires: Not less than one (1) of shut-off type, provided with five-sixteenths (5/16) to one-half ($\frac{1}{2}$) inch tips. Butt size one and one-half ($1\frac{1}{2}$) inch. (One-inch butt with adapter to $1\frac{1}{2}$-inch may be used.)

VII—G: HAND EQUIPMENT:

Two (2) two (2) gallon water canteens (or equal).
Two (2) shovels (No. 2 long handle, round point).
Two (2) asphalt rakes.
Two (2) straw forks.
Two (2) wire brooms.
Not less than four (4) five (5) gallon knapsack spray pumps of approved type.
Two (2) carbon tetrachloride fire extinguishers ($1\frac{1}{2}$ qt. size preferred).
One (1) can for wet sacks.
One (1) wire cutter.
(1) three (3) ft. pinch bar.
One (1) back fire torch (optional).
One (1) electric lantern.
One (1) first aid kit.

VIII—G: OTHER EQUIPMENT:

Complete set of tools for truck.

Set of tools and spark plugs for independent engine.

One (1) tow line.

One (1) siren.

Two (2) red lights.

One (1) search light.

Two (2) safety straps or belts (optional).

One (1) ladder.

IX—G: MOUNTING:

All hand equipment and hose and nozzle equipment shall be so mounted that they will be undamaged and arranged for quick removal and use. All controls shall be placed consistent with convenience and safety.

X—G: TESTS:

The apparatus shall be run a sufficient length of time before delivery to withstand the following tests without overheating the motor or harming the apparatus in any way. The apparatus shall be tested within ten (10) days after delivery in the presence of a representative of the Board of Fire Underwriters of the Pacific, Chief of the Fire Department, and such other persons or person as the Fire Commissioners may designate.

Tests

OBSERVATION TEST:

From observation and charts furnished by the contractor the following paragraphs and sections of the foregoing specifications shall be checked: I-G, II-G, IV-G, V-G, VI-G, VII-G, VIII-G and IX-G.

ROAD TESTS:

The apparatus fully loaded with equipment to be carried, water and four men must meet the following tests: (1) It must make a run over any route selected by the Fire Commissioners or Fire Chief, including only roads in good con-

dition and not including any grade over 10% during which a maximum speed of 40 miles per hour and an average speed of at least 20 miles per hour shall be obtained. (2) While running at road speeds from 1 mile per hour and to 6 miles per hour the tank pump shall deliver its rated capacity at 120 pounds pump pressure for one-quarter hour. During the test the apparatus shall be stopped and started and gears shifted without seriously interrupting the flow from the nozzle. While fully loaded the brakes must stop the apparatus within the limits specified by the Division of Motor Vehicles, State of California.

TANK PUMP TESTS:

The pump shall deliver its rated capacity with 120 pounds net pump pressure for one-half hour and with a suction lift not exceeding 10 ft.

RELIEF VALVE TEST:

The relief valve shall be set and while the pump is delivering capacity discharge gates shall be closed without resulting in excessive pressure at the pump. The test shall be made with the relief valve set at 100 pounds, 150 and 200 pounds.

CONDITION TESTS:

Tests should be made at least annually to determine condition of equipment. If this test shows material deficiency from original standard equipment should be repaired or replaced at once.

SPECIAL REQUIREMENTS FOR RURAL TRUCK No. 1

Introductory

These specifications contemplate a gasoline automobile fire apparatus equipped to effectively fight structure, grass and grain fires in rural communities.

In order to make this equipment most effective for structural fires water supplies should be developed near all building groups. These supplies should be developed within a distance from all buildings of 200 ft. less than the length of hose carried on the apparatus and to consist of a dependable supply from hydrants, reservoirs, tank, irrigation ditches, or other source sufficient to supply pumper for one hour at capacity.

In general the truck is equipped with a 500 g. p. m. fire pump driven by auxiliary motor or the truck motor to be used when the apparatus is stationary, a 300-gallon water tank, hose body and small auxiliary or tank pump taking suction from the water tank that can be operated while the truck is moving. If fire pump is operated by an auxiliary motor the tank pump may be eliminated. The pumping engine should be of a type and make which has successfully passed a 12-hour endurance test but in addition each machine should be tested on delivery with special attention to the three-hour test.

I: TRUCK CHASSIS: (See general requirements.)

1. Capacity: Not more than 16,000 pounds gross weight.
2. Load Distribution: Not more than 70% on rear axle.
3. Road Speed Range: (With normal load.)
   Not more than one (1) M. P. H. to not less than forty M. P. H. continuous operation.
4. Engine:
   a. Not less than eighty-five (85) peak B. H. P. (bare engine at governed speed) and not less than 25

B. H. P. at a road speed of 1 M. P. H. as shown by certified B. H. P.—R. P. M. curves. Torque developed not less than 240 ft. pounds, bare motor.

b. Electric lighting and starting system of approved design.

c. Battery and/or magneto ignition system of approved type.

5. Transmission:

a. Not less than four (4) speeds forward.

b. Gear ratios such that the lowest road speed shall not exceed one (1) M. P. H. (Sec. I-2).

II: WATER TANK: (See general requirements.)

1. Capacity: Not less than three hundred (300) gallons.

2. Height: Center of tank shall not be more than fifteen (15) inches above top of truck frame.

III: TANK PUMP: (See general requirements.)

1. Capacity: Not less than thirty (30) G. P. M. at one hundred twenty (120) pounds pressure per square inch at the pump.

2. Power Requirement: If tank pump is driven by the truck engine, the power required for pumping shall not be more than 15% of the B. H. P. of the engine at any given speed.

IV: FITTINGS AND PIPING FOR TANK PUMP: (See general requirements.)

V: TANK PUMP DRIVE: (See general requirements.)

1. Power Take-Off:

a. The pump speed must be sufficient to discharge not less than twenty (20) G. P. M. at one hundred twenty (120) pounds pressure when the road speed is not more than one (1) M. P. H.

VI: TANK PUMP AND FIELD FIRE EQUIPMENT: (See general requirements.)

VII: HAND EQUIPMENT: (See general requirements.)

VIII: OTHER EQUIPMENT: (See general requirements.)

IX: MOUNTING: (See general requirements.)

X: TESTS: (See general requirements.)

Fire Pump Test: The pumping test shall be made in accordance with the method of the National Board of Fire Underwriters. It shall consist of pumping at full capacity of 500 gallons per minute against a net pump pressure of 120 pounds per square inch for a continuous period of two hours, with a suction lift of not over 10 ft. followed by two one-half periods of continuous pumping, during one of which at least one-half of the full capacity at a net pressure of 200 pounds per square inch shall be delivered, and during the remaining one-half hour, one-third of the full capacity shall be delivered at 250 pounds net pump pressure.

Structural Fire Service Requirements

Note.—If an independent motor is used to operate fire pump the unit must meet the following requirements unless otherwise specified.

GASOLINE ENGINE:

In addition to the requirements specified above, the motor shall be capable of running the pump at its rated capacities at 120 pounds net pressure as hereinafter prescribed without exceeding a motor speed 80 per cent (80%) of the engine speed at the peak of a certified brake horse power curve of the type of motor used, and not to exceed 90 per cent (90%) for other pressures. A supplementary cooling system shall be provided which will permit delivery of water from the fire pump to the engine or the cooling of circulating water; such system shall be designed to prevent undue pressure being obtained in the radiator.

THROTTLE:

A suitable hand throttle, of a type which will positively hold in its set position and controlling the gas supply to

engine, shall be provided, so located that it can be operated from the ground with discharge and suction gauges in full view.

FIRE PUMP CONTROL: (500 g. p. m. Pump):

Provisions shall be made for quickly and easily placing the pump in operation. Positive interference shall be provided so that motor cannot be made to propel the apparatus while pumping, unless pump is operated by an independent motor. All levers used in connection with pumping operations shall be provided with positive catches or other devices which will prevent them from being jarred or knocked out of position, and positions shall be marked "Capacity" and "Pressure."

FIRE PUMP:

The fire pump may be of the displacement, impeller or centrifugal type, carefully designed in accordance with the best modern practice. The suitability of the materials used, the proportions of parts and water ways, clearances, absence of air pockets and flat surfaces under pressure and freedom from vibration and pulsation of water pressure when running at all speeds will be considered in judging the excellence of the design. Pump and connections shall be designed to stand a hydro-static pressure of 350 pounds.

Protection against corrosion and provisions for wear and adjustment must be ample and thorough.

The pump must be capable of delivering at least 500 gallons of water per minute against a net pump pressure of 120 pounds per square inch, one-half of this quantity at 200 pounds net pressure and one-third of the same at 250 net pressure, when drafting water with a lift not exceeding 10 ft. Pump must be able to take suction with a lift of 18 ft. in 15 seconds with dry pump; priming device, if pump is of the centrifugal type, must be able to meet this requirement.

Fire pump is to be provided with the following connections arranged as outlined:

Two side suction inlets, or one front or rear inlet, with centers not more than 4 ft. above the ground; removable strainer to be provided inside each inlet. (For independent motor one suction inlet will be acceptable.)

Two 2½-inch gated outlets, provided with 1-inch drain cock or valve for draining hose line. All couplings to be National Standard, 3-1/16 inches outside diameter, 7½ threads per inch. Contractor to provide adapter couplings if local couplings are not National Standard.

One churn or hand relief valve and automatic relief valves, or a pressure regulator, controlling pressure from all outlets.

One or more pressure gauges on the discharge side, registering up to 400 pounds; to be provided with ¼-inch standard pipe thread connections.

A compound gauge on the suction side of the pump registering at least 150 pounds and to 30 inches vacuum.

Drain, air relief and priming cocks.

Suitable air dome or other arrangement to prevent undue vibration or pulsation.

GEAR RATIOS:

At least two gear ratios or an equivalent device must be provided between pump and engine if pump is of the displacement type.

FUEL CAPACITY:

Not less than two hours supply when operating at capacity.

BODY:

To be of steel or other approved metal or thoruoghly seasoned hardwood, thoroughly reinforced at corners. Bottom in any case to be of hardwood slats in removable parts or sections. The interior of the body to be smooth and free from all sharp projections such as nuts, sharp angles or brackets which might injure hose. Hand rail of 1-inch or larger heavy metal tubing to extend along each side at least four inches above the body, continuing to and securely fastened to the rear. There shall also be suitable brackets and fittings to carry equipment hereinafter specified. Baskets, reels and other appliances shall not be placed over hose body in such a manner as to obstruct the proper placing of hose in the body.

STRUCTURE FIRE EQUIPMENT:

One 12 ft. ladder with folding hooks.

One extension ladder, to extend 24 ft.

One axe.

One 10 ft. pike pole.

Two fire department lanterns, nickel-plated or chromium-plated.

Two 2½-gallon fire extinguishers, nickel-plated or chromium-plated fire department pattern, one to be of soda-acid type and one of foam type.

One 3 ft. crowbar.

Two play pipe cones or screw bases.

20 ft. 4-inch smooth bore, rubber suction hose, of a design giving a low friction loss and which will not collapse under a vacuum of 23 inches of mercury.

One hydrant connection.

One metal strainer for suction hose.

One 2½-inch double female connection.

One 2½-inch double male connection.

NOTE:

Nozzles and 2½-inch hose are not included in this list of equipment, being usually purchased under separate contracts; for satisfactory fire service there should be two play pipes with shut-off nozzles with smooth-bore tips, ½-inch or ⅝-inch, 1-inch, 1⅛-inch and 1¼-inch.

SPECIAL REQUIREMENTS FOR GRASS AND GRAIN FIRE TRUCK No. 2

Introductory

These specifications contemplate a gasoline power driven fire apparatus having a chassis of not more than 12,000 pounds manufacturers gross weight capacity, carrying a water tank, high pressure pump, two high pressure hose lines with nozzles of small capacity for fighting grass and grain fires while the truck is moving or stationary. The apparatus is to include a quantity of hand tools and extinguishers useful for running fires. Furthermore, provision is made for the use of 1½-inch hose lines with suitable pumping capacity and nozzles for structure fires, to be used mainly while pumping from a source of water while the truck is stationary.

The pump may be driven either by the truck engine or by a suitable independent engine.

Mobility of the apparatus is of prime importance which requires particular attention to engine characteristics, gear ratios, weight, center of gravity and traction.

Since a satisfactory grain and grass fire truck must be able to travel at high speeds on the highway and at a very low speed on the fire line, the transmission system must have a greater range than is at present generally furnished as standard equipment for commercial trucks of this size. Special designs may be avoided by the use of auxiliary transmission which will give six or more speeds.

These specifications are not to be considered sufficiently detailed to use for bidding, but rather to serve as a basis for the main requirements to be met by the apparatus.

I: TRUCK CHASSIS: (See general requirements.)

1. Capacity: Not more than 12,000 pounds gross weight.
2. Load Distribution: Not more than 70% on rear axle.

3. Road Speed Range: (With normal load.) From not more than one (1) M. P. H. to not less than forty (40) M. P. H., continuous operation.

4. Engine:

   a. Not less than 80 peak B. H. P. (bare motor at governed speed).

   b. Torque developed not less than 225 ft. pounds, bare motor.

   c. Electric lighting and starting system of approved design.

   d. Battery or magneto ignition system of approved type. If magneto is used it must be furnished with an approved impulse starter coupling.

5. Transmission:

   a. Not less than four (4) speeds forward.

   b. Gear ratios such that the lowest road speed shall not exceed one (1) M. P. H. with suitable engine speed to propel the truck and drive a tank pump if driven by the truck engine, also ability of the truck fully loaded, to negotiate grades of 25% while operating tank pump.

   c. Torque capacity of transmission system to be equal to that developed by the engine.

II: WATER TANK: (See general requirements.)

1. Capacity: Not less than 250 gallons.

2. Height: Center of tank shall not be more than fifteen inches (15) above top of truck frame.

III: TANK PUMP: (See general requirements.)

1. Capacity: Not less than 30 G. P. M. at one hundred twenty pounds pressure per square inch at pump.

IV: FITTINGS AND PIPING: (See general requirements.)

V: TANK PUMP DRIVE: (See general requirements.)

1. Power Take-Off: (Where pump is driven by truck engine.)

a. The pump speed must be sufficient to discharge not less than 30 G. P. M. at one hundred twenty pounds pressure when the road speed is not more than one M. P. H.

2. Independent engine (see general requirements).

VI: HOSE AND NOZZLE EQUIPMENT: (See general requirements for tank pump and field fire equipment.)

VII: HAND EQUIPMENT: (See general requirements.)

VIII: OTHER EQUIPMENT: (See general requirements.)

IX: MOUNTING: (See general requirements.)

X: TESTS: (See general requirements.)

XI: FIRE PUMP: The fire pump shall be capable of meeting all the requirements under fire pump for Truck No. 1 except as follows:

1. The pump must be capable of delivering 250 gallons of water per minute against a net pump pressure of 120 pounds per square inch.
2. One $2\frac{1}{2}$-inch outlet or two $1\frac{1}{2}$-inch outlets shall be required.

Note.—The fire pump may be used as a tank pump provided it complies with tank pump and tank pump drive requirements.

SPECIAL REQUIREMENTS FOR GRASS AND GRAIN FIRE TRUCK No. 3

Introductory

These specifications contemplate a gasoline power driven fire apparatus having a chassis of not more than 7500 pounds manufacturer's gross load capacity carrying a water tank, high pressure pump, two high pressure hose lines with nozzles of small capacity for fighting grass and grain fires while the truck is moving or stationary. The apparatus is to include a quantity of hand tools and extinguishers useful for running fires. Furthermore, provision is made for the use of 1-inch or 1½-inch hose lines with suitable nozzles for structure fires, to be used mainly while pumping from a source of water while the truck is stationary.

The pump may be driven either by the truck engine or by a suitable independent engine.

Mobility of the apparatus is of prime importance which requires particular attention to engine characteristics, gear ratios, weight, center of gravity and traction.

Since a satisfactory grain and grass fire truck must be able to travel at high speeds on the highway and at very low speeds on the fire line, the transmission system must have a greater range than is at present generally furnished as standard equipment for commercial trucks of this size. Special designs may be avoided by the use of auxiliary transmissions which will give six or more speeds.

These specifications are not to be considered sufficiently detailed to use for bidding, but rather to serve as a basis for the main requirements to be met by the apparatus.

I: TRUCK CHASSIS: (See general requirements.)

1. Capacity: Gross weight not more than 7500 pounds, manufacturer's rating.
2. Load Distribution: Not more than 60% on rear axle.
3. Road Speed: (With normal load.) From not more than one (1) M. P. H. to not less than forty (40) M. P. M. Continuous operation.

4. Engine:
   a. Not less than seventy (70) B. H. P. at not to exceed 3000 R. P. M. of engine. Ft. pounds of torque developed not less than 200, bare motor.
   b. Electric lighting and starting system of approved design.
   c. Battery or magneto ignition system of approved type. If magneto is used it must be furnished with an approved impulse starter coupling.
5. Transmission:
   a. Not less than four speeds forward.
   b. Gear ratios such that the lowest road speed shall not exceed three (3) M. P. H. with suitable engine speed to propel the truck and drive a tank pump if driven by truck engine.
   c. Torque capacity of transmission system to be equal to that developed by the engine.

II: WATER TANK: (See general requirements.)
1. Capacity: Not less than one hundred fifty 150) gallons.
2. Height: Center of tank shall not be more than fifteen (15) inches above top of truck frame.

III: TANK PUMP: (See general requirements.)
1. Capacity: Not less than sixty (60) G. P. M. at one hundred twenty (120) pounds pressure per square inch at the pump.

IV: FITTINGS AND PIPING: (See general requirements.)

V: TANK PUMP DRIVE: (See general requirements for auxiliary pump drive.)
1. Power Take-Off: (Where pump is driven by truck engine.)
   a. The pump speed must be sufficient to discharge not less than thirty (30) G. P. M. at one hundred twenty (120) pounds pressure when the road speed is not more than three (3) M. P. H.
2. Independent engine (see general requirements).

VI: HOSE AND NOZZLE EQUIPMENT: (See general requirements for tank pump and field fire equipment.)

VII: HAND EQUIPMENT: (See general requirements.)

VIII: OTHER EQUIPMENT: (See general requirements.)

IX: MOUNTING: (See general requirements.)

X: TESTS: (See general requirements.)

Form 412BFU—3500—3-38.